Table 1

Bactericidal activities of the synthetic and control peptides towards representative Gram-negative and Gram-positive bacteria

Bactericidal activity towards 10^7 E. coli 0111:B4 bacteria/ml LB medium at 37°C		
Peptide	Concentration effective dose (M^{-6})	% bacteria killed
BP1	3	88
BP2	3	91
$BPI_{(85-102)}$	3	31
Bactericidal activity towards 10^7 S. aureus bacteria/ml LB medium 37°C		
Peptide	Concentration effective dose (M^{-6})	% bacteria killed
BP1	3	34
BP2	3	55
$BPI_{(85-102)}$	3	0

We claim:

1. A peptide comprising at least 12 amino acids, the peptide having an amino acid composition such that the peptide is amphipathic, cationic and forms a stable α-helix and has the following formula:

$$R^1\text{-}R^2\text{-A-B-(A-B-C-A)}_m\text{-(C)}_n\text{-}R^3,$$

wherein

each A is independently selected from the basic amino acids Lys, Arg and His,

each B is independently selected from the aromatic amino acids Phe, Trp and Tyr,

each C is independently selected from the hydrophobic amino acids Leu, Ile, Val and Ala,

m is a number from 2 to 8,

n is a number from 1 to 3,

16. The pharmaceutical composition according to claim 15, wherein the infection is caused by an organism or compound of an organism, said organism being selected from the group comprising a bacterium, a fungus, a virus and a parasite.

17. The pharmaceutical composition according to claim 15, wherein the infection is caused by a bacterium.

18. The pharmaceutical composition according to claim 15, wherein the infection is caused by a bacterium exhibiting multiple drug resistance (MDR).

19. The pharmaceutical composition according to claim 15, wherein the infection is caused by a Gram positive bacterium.

20. The pharmaceutical composition according to claim 15, wherein the infection is caused by a Gram negative bacterium.

21. A pharmaceutical composition comprising a mixture of at least two peptides according to claim 1 as active components for treating topical and systemic microbial and/or parasite infections, and a pharmaceutically acceptable carrier in a pharmaceutically acceptable dosage form.

22. The pharmaceutical composition according to claim 15, further comprising an antibiotic from the class consisting of penicillins, cephalosporins, ß-lactams, amino-glycosides, quinolones, tetracyclines, macrolides, glycopeptides or lipopeptides, hydrophobic antibiotics, ribosome inhibitors or antibiotics having a large lipid-like lactone ring, or derivatives or analogues thereof.

23. The pharmaceutical composition according to claim 15, wherein the infection is caused by a parasite such as the parasite causing malaria or Trypanosomiosis.

24. A pharmaceutical composition comprising a peptide according to claim 1 as active component for treating topical and systemic tumors, and a pharmaceutically acceptable carrier in a pharmaceutically acceptable dosage form.

25. A pharmaceutical composition comprising a peptide according to claim 1 as active component for treating inflammation, and a pharmaceutically acceptable carrier in a pharmaceutically acceptable dosage form.

26. A pharmaceutical composition comprising a peptide according to claim 1 as active component for treating septic shock.

27. The pharmaceutical composition according to claim 15, wherein the treatment is prophylactic.

28. A method of treatment of a mammal including a human suffering from microbial infection, comprising administering a peptide according to claim 1 in a pharmacologically acceptable form to said mammal.

29. The method according to claim 28, wherein said treatment is applied after trauma or suspected infection has or can have occurred.

30. The method according to claim 28, wherein said treatment is applied after surgery.

31. A method of diagnosis comprising determining the presence of endotoxin in a sample of body matter of a mammal using a peptide according to claim 1 in a manner known per se in an assay capable of detecting degree of binding to Lipid A such as a solid state Lipid A binding assay.

32. A method of diagnosis comprising contacting a sample of body matter of a mammal with a peptide according to claim 1 and assessing whether complex formation between said matter and the peptide occurs and optionally determining how much complex formation occurs in a manner known per se such as a solid state Lipid A binding assay.

33. A method according to claim 31, wherein the sensitivity is higher than obtainable with the Limulus assay on said sample.

34. A method according to claim 32, wherein the sensitivity is such that a detection level of 0.1 pg/ml in plasma is achieved.

35. A method for removal of endotoxin from a sample, comprising contacting said sample with a peptide according to claim 1 and removing the resulting complex of endotoxin and peptide in a manner known per se, such as an assay with immobilised peptide.

36. The method according to claim 35, wherein the endotoxin can be removed to a substantial level of more than 95%, preferably more than 98%.

37. A method for removal of LPS from a sample, comprising contacting said sample with a peptide according to claim 1 and removing the resulting complex of LPS and peptide in a manner known per se, such as an assay with immobilised peptide.

38. The method according to claim 37, wherein the sample is derived from or consists of donor material for transplant or implant.

39. The method according to claim 37, wherein the sample is a blood sample.

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wherein one or more of the repetitive sequence motifs (A-B-C-A) may have the retro orientation (A-C-B-A),

R^1-R^2 and R^3 are a number of amino acids,

said peptide having either the orientation according to the formula or the retro orientation thereof.

2. The peptide according to claim 1, in which R^1-R^2 and R^3 each have a number of amino acids ranging from 0 to 15.

3. The peptide according to claim 1, in which R^1-R^2 and R^3 each have a number of amino acids ranging from 1 to 10.

4. The peptide according to claim 1, wherein R^1 is selected from the group of sequences consisting of

ACAA, wherein each A and C is independently as defined in claim 1;

Gly_p, wherein p = 0-10 and

Ala_q, wherein q = 0-10.

5. The peptide according to claim 1, wherein R^1-R^2 and/or R^3 does not comprise an amino acid from those of group A, B or C as defined in claim 1.

6. The peptide according to claim 1, wherein the repetitive sequence (A-B-C-A) is present in the retro orientation more often than in the orientation as presented in the formula.

7. The peptide according to claim 1, wherein n = 3.

~~8. The peptide BP 1, having Sequence id. no.1~~

9. The peptide BP 2, having Sequence id. no. 2

10. The peptide BP 2.3, having Sequence id. no. 3

11. The peptide BP 2.4, having Sequence id. no. 4

12. The peptide BP 2.5, having Sequence id. no. 5

13. The peptide according to claim 1, wherein the peptide is coupled to a non-peptide carrier, tag or label.

14. A fusion peptide comprising the peptide of claim 1 coupled to a second peptide selected form peptide carriers and diagnostic peptides.

15. A pharmaceutical composition comprising a peptide according to claim 1 as active component for treating topical and systemic microbial and/or parasite infections, and a pharmaceutically acceptable carrier in a pharmaceutically acceptable dosage form.